

**REMARKS**

Applicant wishes to thank the Examiner for the careful consideration given to this case. As noted by the Examiner, claims 1-3, 10, and 18 are withdrawn from consideration by the Applicant, however, Applicant reserves the right to pursue these claims without prejudice in later filed divisional applications. Claim 4-9, 11-17 and 19-25 are pending in the case. A translated copy of the Izoard reference used by the applicant is provided for the Examiner's convenience to identify page numbers and paragraphs in the remarks *vide infra*.

In the Abstract, page 35, line 3; the word "comprising" has been replaced with the word "includes". No new matter was added.

The CROSS RELATED PATENTS, paragraph [001], in the specification was amended to properly reference the U. S. Patent Application number 6,313,436 rather than the incorrect U.S. Patent Application 6,313,921 in the original specification. No new matter was added.

Claims 4-9, 11-17, and 19-25 were rejected by the Examiner under 35 U.S.C. §112 first paragraph. In the Examiner's opinion that the Claims 4-9, 11-17, and 19-25 contained subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most clearly connected, to make and use the invention. Specifically, the Examiner alleges that there is no disclosure of any specific mixed organic pigment material that is applied to a plastic substrate.

In Figure 9 of the instant invention, the applicant discloses several examples of marking materials on substrates. One example includes a mixed organic pigment on a polymer substrate PVC (polyvinyl chloride). Conditions for marking the PVC substrate coated with the organic pigments, such as marking speed and laser output power are given.

Marking materials in the instant invention are defined, (pp 23, lines 20-25), within the specification as those materials which, upon application of sufficient laser or diode based energy to produce the necessary heat to bond to glass or ceramic or other non-porous substrate to provide an enhanced contrast and or color marking on the substrate. Examples of suitable plastic substrates are give in Table 1 of the specification.

The test of enablement is whether one reasonably skilled in the art to which it pertains could make or use the invention from the disclosures in a patent coupled with information known in the art without undue experimentation (MPEP 2164.01). If two distinct technologies are relevant to an invention, then the disclosure will be adequate if a person of ordinary skill in the art in each of the two technologies could produce the invention from the disclosures (MPEP 2164.05(b)). In the instant invention a dye or pigment chemist may be representative and would to look to organic molecules which are colored and chromophoric – those which absorb energy - to be used in the practice of the invention.

A chemist of ordinary skill in the art would be able to find a Color Index, see for Example McGraw-Hill Encyclopedia of Chemistry, 2<sup>nd</sup> Ed., pp 297-309, listing various organic pigments or mixtures of organic pigments, (pp 21, lines 11-32) which may be applied to substrates. Various parameters disclosed in the instant invention, for example the laser beam size, power, and beam speed, as well as the method of applying such pigments to substrates, could be used by the skilled artisan to mark a variety of plastic substrates (pp 20, Table I) without undue experimentation. It is respectfully submitted that the specification is enabled and that the Examiner's rejections be withdrawn.

Claims 4 and 8 were rejected by the Examiner as allegedly being anticipated by EP Patent No. 0419377 (Izoard et al.) under 35 U.S.C. §102(b). The Examiner has characterized

the Izoard et. al. reference as purportedly disclosing “applying a layer of mixed organic pigment (at least 3% organic pigment) and using oxides of titanium and chromium as energy absorbing enhancer.” The Examiner further characterizes the reference as disclosing irradiating the layer with a radiant energy beam having a wavelength that excites the energy absorbing enhancer.” The translation of the reference provided by the applicant purportedly discloses, (page 3, paragraph 2) “The reaction caused by the laser beam can be a chemical reaction resulting in a color change or vaporization of the paint, or a physical reaction producing a sufficient contrast.” It also discloses (page 3, paragraph 1) “the action of the laser beam causes a deterioration of the binder or engraves the paint, rendering said marking visible; the inscription process, carried out by the movement of the laser beam towards the points to be engraved”.

Claim 4 of the instant invention claims “irradiating said layer... thereby forming a marking layer atop the substrate.” Applicant’s specification uses “atop” in the following manner (page 9, lines 15-17): “the marking material and substrate will permanently bond together to form a new marking layer atop the substrate.” The process of the present invention is not an engraving or inscription and therefore claim 4 is not anticipated by Izoard et al. Since claim 8 depends from claim 4, neither claim in the instant invention is anticipated by Izoard et al., and it is respectfully submitted that the rejections be withdrawn.

Claim 9 was rejected by the Examiner under 35 U.S.C. § 103(a) as allegedly being unpatentable over Izoard et al. The instant invention may be practiced without preheating of the work piece. Adapting the material of Izoard et al. to 70 degrees Fahrenheit would result in engraving or inscription on irradiation of the marking material on the substrate. Since the instant invention is not an adaptation of Izoard et al., *vide supra*, it would not be obvious that the

instant invention would result in a marking atop of the substrate without preheating of the substrate; it is respectfully submitted that the rejection be withdrawn.

Claim 5 was rejected by the Examiner under 35 U.S.C. § 103(a) as allegedly being unpatentable over Izoard et al. in view of Ishikawa et al. in Japan Patent No. 60-199,660. Ishikawa et al. purportedly teaches using laminar air flow over the work piece to prevent fouling of the optics during laser marking. The Examiner contends that it would have been obvious to adapt Izoard et al. in view of Ishikawa et al. to provide this laminar flow to prevent fouling of the optics. The combination of Izoard et al. and Ishikawa et al. would not result in a marking atop of the substrate as claimed in the instant invention. Prevention of optics fouling in the process of Izoard et al. would still result in a vaporization, engraving, or inscription of the substrate by the action of the laser on the marking material. The combination of the references does not teach or suggest the method of claim 5 in the instant invention and it is respectfully submitted that the Examiner's rejection be withdrawn.

Claim 6 was rejected by the Examiner under 35 U.S.C. § 103(a) for allegedly being obvious over Izoard et al. in view of Sadamoto et al. in Japan Patent No. 63-216,790 and Spanjer in U. S. Patent No. 4,654,290. The Examiner contends that it would have been obvious to adapt Izoard et al. in view of Sadamoto et al. and Murakami et al. to provide this to stabilize and increase the absorption of the pigment. The combination of the cited reference elements adapted to the method of Izoard et al., which "cause deterioration of the binder or engraves the paint" (Izoard et al, pp 3, paragraph 1), does not result in "forming a marking layer atop of the substrate" as recited in the instant invention. It is respectfully submitted that claim 6 is not anticipated by the cited references and that the Examiner's rejection be withdrawn.

Claim 7 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Izoard et al. in EP 419,377 A1 in view of Sadamoto et al. in Japan Patent No. 8-174,263, Kiyonari et al. in U.S. Patent No. 5,035,983 and Emge et al. in U.S. Patent No. 6,037,968. According to the Examiner, Sadamoto et al. purportedly teaches using a laser with a power level no more than 30 watts and a scanning speed of 1mm/second to 400 mm/second and Kiyonari et al. teaches marking with a "spot of suitable size" and Emge et al. teaches using a laser beam with a spot size less than 50 microns. In the Examiner's opinion it would have been obvious to adapt Izoard et al. in view of the other references to adjust these parameters to optimize the laser marking process. Emge discloses that the laser energy is used with a print foil transfer medium that is "capable of converting laser energy to heat in which a curable laser-transferrable ink having one or more layers is deposited on a carrier. The carrier must have sufficiently low surface energy to permit transfer of the ink.. It must also *not* melt or otherwise deform upon laser irradiation." (column 16, lines 39-44). The Emge reference could not be combined with Izoard et al. reference with there being a reasonable expectation of success of the combination. It is respectfully submitted that a *prima facie* case of obviousness has not been made by the Examiner and that the Examiner's rejection be withdrawn.

Claims 11, 20 and 21 were rejected by the Examiner under 35 U.S.C. § 103(a) as allegedly being unpatentable over Izoard et al. in EP 419,377 A1 in view of Seuss et al. in U.S. Patent No. 5,986,078. In the Examiner's opinion, Izoard et al. meets all of the limitations of claims 11 and 20 except using a carrier that is placed in contact with the workpiece prior to laser treatment to create a marking on the workpiece. In the Examiner's opinion it would have been obvious to adapt Izoard et al. in view of Seuss et al. to provide this so that only part of the workpiece receives the pigment layer. Seuss et al. disclose "the first or outer colored lacquer

layer is removed by means of the laser radiation in a region-wise manner, thereby to expose the differently colored lacquer layer therebeneath, producing the marking effect.” (column, 2, lines 47-50). A combination of the Izoard et al. and Seuss references does not describe the instant invention as described in claims 11, 20, and 21. It is respectfully submitted that instant invention is patentable over the references and that the Examiner’s rejection be withdrawn.

Claims 12, 16, 17 and 22 were rejected by the Examiner under 35 U.S.C. § 103(a) as allegedly being unpatentable over Izoard et al. in EP 419,377 A1 in view of Zambounis et al. in U.S. Patent No. 5,840,449. The Examiner has characterized Izoard et al. as disclosing application of a layer of mixed organic pigment material (at least 3% organic pigment) and using oxides of titanium and chromium oxide as an energy absorbing enhancer. In the Examiner’s opinion, Zambounis et al. teaches (see column 17, lines 37-39) applying a coating by a stencil to only part of the workpiece (which teaches one of ordinary skill in the art that only the part of the substrate that is to be marked has coating applied). The combination of the two references would not meet the limitations of claim 12, 16, 17, and 22 by forming a marking layer atop the substrate. As stated by the Applicant *vide supra*, it would not be obvious that the methods of the present invention could be accomplished without thermal pretreatment. The claims of the instant invention are patentable in view of the combination of the cited references, and it is respectfully submitted that the Examiner’s rejection be withdrawn.

Claim 13 was rejected by the Examiner under 35 U.S.C. § 103(a) as being unpatentable over Izoard et al. in view of Zambounis et al. in U.S. Patent No. 5,840,449 as applied to claim 12 above, and further in view of Ishikawa et al. in Japan Patent No. 60-199,660. Ishikawa et al. teaches using a laminar air flow over the workpiece to prevent fouling of the optics during laser marking. In the Examiner’s opinion, it would have been obvious to adapt

Izoard et al. in view of Zambounis et al. and Ishikawa et al. to provide to prevent fouling of the optics during laser marking. The combination of Izoard et al., Zambounis et al., and Ishikawa et al. would not result in a marking atop of the substrate as claimed in the instant invention.

Prevention of optics fouling in the process of Izoard et al. would still result in a vaporization, engraving, or inscription of the substrate by the action of the laser on the marking material. The combination of the references does not teach or suggest the method of claim 13 in the instant invention as required for a *prima facie* case of obviousness, and it is respectfully submitted that the Examiner's rejection be withdrawn.

Claim 14 was rejected by the Examiner under 35 U.S.C. § 103(a) as allegedly being unpatentable over Izoard et al. in EP 419,377A1 in view of Zamounis et al. in U.S. Patent No. 5,840,449 as applied to claim 12 above, and further in view of Sadamoto et al. in Japan Patent No. 8-174,263, Murakami et al. in Japan Patent No. 63-216,790 and Spanjer in U.S. Patent No. 4,654,290. According to the Examiner, Sadamoto et al. teaches using carbon black as an energy absorbing material in a pigment, Murakami et al. teaches that a laser beam with a wavelength of 1064 nm is easily absorbed by carbon black, and Spanjer in U.S. Patent No. 4,654,290 teaches using carbon black to improve color contrast and stabilize the mixture. In the Examiner's opinion it would have been obvious to adapt Izoard et al. in view of Zambounis et al., Sadamoto et al., Murakami et al. and Spanjer to provide this to improve color contrast and increase the absorption of the pigment. The combination of the cited reference elements adapted to the method of Izoard et al., which "cause deterioration of the binder or engraves the paint" (Izoard et al., pp 3, paragraph 1), does not result in "forming a marking layer atop of the substrate" as recited in claim 12 of the instant invention. Since claim 14 depends from claim 12,

it is respectfully submitted that claim 14 is patentable over the combination of the cited references and that the Examiner's rejection be withdrawn.

Claim 15 was rejected by the Examiner under 35 U.S.C. § 103(a) as allegedly being unpatentable over Izoard et al. in view of Zambounis et al. as applied to claim 12 above, and further in view of Sadamoto et al. in Japan Patent No. 8-174,263. According to the Examiner, Sadamoto et al. teaches using a laser with a power level of no more than 30 watts and a scanning speed of 1mm/second to 400mm/second. In order to make a *prima facie* case of obviousness, the combination cited by the Examiner must teach or suggest all the claim limitations. The combination of Izoard et al. with the cited references does not meet the limitations of Claim 15 of the instant invention in that a marking layer atop the substrate is not produced. Claim 15 is patentable over the combination of the references and that the Examiner's rejection should be withdrawn.

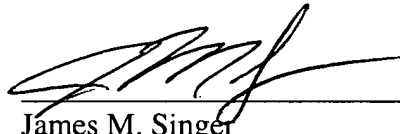
Claims 19, 23-25 were rejected by the Examiner under 35 U.S.C. § 103(a) as allegedly being unpatentable over Izoard et al. in EP 419,377 A1 in view of Sadamoto et al. in Japan Patent No. 8-174,263. In the Examiner's opinion, Izoard et al. meets all of the limitations of claims 19, 23-25 except Izoard et al. does not appear to specifically disclose that the radiant energy (laser) beam interacting with the marking material forming a bonded layer with the substrate. Sadamoto et al., however, teaches that the part of the marking layer that has been treated by the beam remains even after wiping a cloth over the substrate surface. The Examiner states that it would have been obvious to adapt Izoard et al. in view of Sadamoto et al. to provide this to create a firm mark that has been bonded to the substrate. The Examiner states that Izoard et al. does not appear to specifically disclose that the radiant energy (laser) beam interacting with the marking material forms a bonded layer to the substrate. Further, application of the method of



Izoard et al. which causes deterioration of the binder and engraves the paint (pp 3, first paragraph), to the marking layer of Sadamoto et al. which uses the resin powder of the substrate as a binder, would degrade the resin and or engrave the substrate. The combination is not operative to form a bonded layer as suggested by the Examiner. A *prima facie* case of obviousness has not been established by the examiner for claim 19 in which an adhered layer is formed atop the substrate. Similarly, a *prima facie* case of obviousness has not been established for claim 23, and hence claims 24-25 which depend from claim 23, in which a bonded layer of the marking material is formed atop the substrate.

In view of the remarks presented above, it is believed that pending claims 4-9, 11-17, and 19-25 are in condition for allowance and notice to such effect is respectfully requested. Should the Examiner have any questions regarding these remarks, the Examiner is invited to initiate a telephone conference with the undersigned.

Respectfully Submitted,



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AMENDMENTS

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE ABSTRACT

Following is the marked version illustrating the difference between the deleted ABSTRACT that was filed on November 6, 2001 and the replacement ABSTRACT.

A method of laser marking metals, plastics, ceramic materials, glazes, glass ceramics, and glasses of any desired form, which [comprises] includes applying to the material to be marked a variable thickness layer of marking material containing energy absorbing enhancers then irradiating said layer with a laser or diode based energy source such that the radiation is directed onto said layer in accordance with the form of the marking to be applied, and using a laser or diode based energy source of a wavelength which is sufficiently absorbed by the marking material so as to create a bonding of the marking material to the surface of the workpiece at the irradiated areas.

IN THE SPECIFICATION

Following is the marked version illustrating the difference between the deleted first paragraph under the heading CROSS RELATED PATENTS in the Specification that was filed on November 6, 2001 and the replacement paragraph.

(Once Amended) This application is a divisional application from U.S. [App.]Application Ser. No. 09/477,921 filed [01/05/00]January 5, 2000, issued as U.S. Pat. No. 6,313,921436 on [11/06/01]November 6, 2001, which was a divisional of the parent U.S. [App.]Application Ser. No. 08/925,031 filed [9/8/97]September 8, 1997 and issued as U.S. Pat. No. 6,075,223 on [6/13/00]June 13, 2000.